CLAIMS

1.   A pattern comparison inspection method which captures an image of an inspection target pattern having a repeated pattern region with repeated patterns formed in a repeated fashion at a prescribed repeat pitch, and which detects a defect in said inspection target pattern by comparing image signals taken from positions located a first integral multiple of said repeat pitch away from each other within an inspection region defined inside said repeated pattern region, said method comprising:

a reference position selecting step for selecting from among positions on said inspection target pattern a reference position which is judged whether it should be contained in said inspection region;

an image comparing step for comparing an image signal at said reference position with an image signal at a position located a second integral multiple of said repeat pitch away from said reference position; and

an inspection region setting step for setting said inspection region by containing therein said reference position when a comparison result from said image comparing step shows a value not greater than a prescribed threshold value.

2.   A pattern comparison inspection method which captures an image of an inspection target pattern having a repeated pattern region with repeated patterns formed in a repeated fashion at a prescribed repeat pitch, and which detects a defect in said inspection target pattern by comparing image signals taken from positions located a first integral multiple of said repeat pitch away from each other within an inspection region defined inside said repeated pattern region, said method comprising:

a reference position selecting step for selecting a reference position which is judged whether it should be contained in said inspection region, by incrementally shifting said reference position by a

prescribed distance within said inspection target
pattern;

an image comparing step for comparing an
image signal at said reference position with an image
signal at a position located a second integral multiple
of said repeat pitch away from said reference position;
and

an inspection region setting step for
setting said reference position as the boundary of said
inspection region when a comparison result from said
image comparing step performed by incrementally shifting
said reference position by said prescribed distance shows
a change greater than a prescribed threshold value.

3.   A pattern comparison inspection method which
captures an image of an inspection target pattern having
a repeated pattern region with repeated patterns formed
in a repeated fashion at a prescribed repeat pitch, and
which detects a defect in said inspection target pattern
by comparing image signals taken from positions located a
first integral multiple of said repeat pitch away from
each other within an inspection region defined inside
said repeated pattern region, said method comprising:

a reference position selecting step for
selecting a reference position which is judged whether it
should be contained in said inspection region, by
incrementally shifting said reference position by a
prescribed distance within said inspection target
pattern;

an image comparing step for comparing an
image signal at said reference position with an image
signal at a position located a second integral multiple
of said repeat pitch away from said reference position;
and

an inspection region setting step for
setting said reference position as the boundary of said
inspection region when a comparison result from said
image comparing step performed by incrementally shifting

said reference position by said prescribed distance shows a maximum change.

4.   A pattern comparison inspection method as claimed in any one of claims 1 to 3, wherein said image comparing step compares said image signal at said reference position with an image signal at a position located farther inside said repeated pattern region than said reference position is.

5.   A pattern comparison inspection method as claimed in any one of claims 1 to 3, wherein a position located a prescribed distance inward of the boundary of said repeated pattern region is selected as said reference position, and

said inspection region is set by repeatedly performing said image comparing step while incrementally moving said reference position outwardly toward the boundary of said repeated pattern region.

6.   A pattern comparison inspection method as claimed in any one of claims 1 to 3, further comprising a tentative region setting step for setting a tentative region a prescribed distance inward of the boundary of said repeated pattern region, and wherein

said image comparing step compares said image signal at said reference position with an image signal at a position located inside said tentative region.

7.   A pattern comparison inspection method as claimed in claim 6, wherein a position located inside said tentative region is selected as said reference position, and

said inspection region is set by repeatedly performing said image comparing step while incrementally shifting said reference position outwardly toward the boundary of said repeated pattern region.

8.   A pattern comparison inspection method as claimed in any one of claims 1 to 3, wherein a position located a prescribed distance outward of the boundary of

said repeated pattern region is selected as said reference position, and

said inspection region is set by repeatedly performing said image comparing step while incrementally shifting said reference position inwardly toward the boundary of said repeated pattern region.

9. A pattern comparison inspection method which captures an image of an inspection target pattern having a repeated pattern region with repeated patterns formed in a repeated fashion at a prescribed repeat pitch, and which detects a defect in said inspection target pattern by comparing image signals taken from positions located an integral multiple of said repeat pitch away from each other, said method comprising:

a defect candidate detecting step for comparing a predetermined first threshold value with a difference value taken between pixels separated from each other by a number of pixels equivalent to said integral multiple of said repeat pitch in said captured image of said inspection target pattern, and for detecting any pixel for which said difference value exceeds said first threshold value as a defect candidate;

an inspection range determining step for selecting a reference range of a prescribed size within said captured image of said inspection target pattern, and for determining an inspection range by containing therein said reference range if the number of defect candidates contained in said reference range or the proportion of said defect candidates contained in said reference range is smaller than a predetermined second threshold value; and

a detecting step for detecting a defect in said inspection target pattern within said inspection range.

10. A pattern comparison inspection method as claimed in claim 9, further comprising:

a defect candidate map generating step for

generating a defect candidate map by obtaining said defect candidate in said defect candidate detecting step for each pixel in said captured image of said inspection target pattern; and

5   a reference range selecting step for selecting a reference range of a prescribed size within said defect candidate map, wherein

said inspection range determining step determines said inspection range by containing therein

10   said selected reference range if the number of defect candidates contained in said reference range or the proportion of said defect candidates contained in said reference range is smaller than said predetermined second threshold value.

15   11. A pattern comparison inspection method which captures an image of an inspection target pattern having a repeated pattern region with repeated patterns formed in a repeated fashion at a prescribed repeat pitch, and which detects a defect in said inspection target pattern

20   by comparing image signals taken from positions located an integral multiple of said repeat pitch away from each other, said method comprising:

a defect candidate detecting step for comparing a predetermined first threshold value with a

25   difference value taken between pixels separated from each other by a number of pixels equivalent to said integral multiple of said repeat pitch in said captured image of said inspection target pattern, and for detecting any pixel for which said difference value exceeds said first

30   threshold value as a defect candidate;

an inspection range determining step for selecting a reference range of a prescribed size within said captured image of said inspection target pattern by incrementally changing the position of said reference

35   range relative to a prescribed direction, and for determining an inspection range by containing therein said position relative to said prescribed direction if

the number of defect candidates contained in said reference range or the proportion of said defect candidates contained in said reference range is smaller than a predetermined second threshold value; and

5   a detecting step for detecting a defect in said inspection target pattern within said inspection range.

12. A pattern comparison inspection method as claimed in claim 11, further comprising:

10   a defect candidate map generating step for generating a defect candidate map by obtaining said defect candidate in said defect candidate detecting step for each pixel in said captured image of said inspection target pattern; and

15   a reference range selecting step for selecting a reference range of a prescribed size within said defect candidate map by incrementally changing the position of said reference range relative to a prescribed direction, wherein

20   said inspection range determining step determines said inspection range by containing therein said position relative to said prescribed direction if the number of defect candidates contained in said reference range or the proportion of said defect

25 candidates contained in said reference range is smaller than said predetermined second threshold value.

13. A pattern comparison inspection apparatus which comprises an imaging portion which captures an image of an inspection target pattern having a repeated pattern

30 region with repeated patterns formed in a repeated fashion at a prescribed repeat pitch, a storing portion which stores said captured image of said inspection target pattern, a pattern comparing portion which compares, on said stored image, image signals taken from

35 positions located a first integral multiple of said repeat pitch away from each other within an inspection region defined inside said repeated pattern region, and a

defect detecting portion which detects a defect in said inspection target pattern based on a result of said comparison, said apparatus comprising:

a reference position selecting portion which selects from among positions on said inspection target pattern a reference position which is judged whether it should be contained in said inspection region;

an image comparing portion which compares an image signal at said reference position with an image signal at a position located a second integral multiple of said repeat pitch away from said reference position; and

an inspection region setting portion which sets said inspection region by containing therein said reference position when a comparison result from said image comparing portion shows a value not greater than a prescribed threshold value.

14. A pattern comparison inspection apparatus which comprises an imaging portion which captures an image of an inspection target pattern having a repeated pattern region with repeated patterns formed in a repeated fashion at a prescribed repeat pitch, a storing portion which stores said captured image of said inspection target pattern, a pattern comparing portion which compares, on said stored image, image signals taken from positions located a first integral multiple of said repeat pitch away from each other within an inspection region defined inside said repeated pattern region, and a defect detecting portion which detects a defect in said inspection target pattern based on a result of said comparison, said apparatus comprising:

a reference position selecting portion which selects a reference position which is judged whether it should be contained in said inspection region, by incrementally shifting said reference position by a prescribed distance within said inspection target pattern;

an image comparing portion which compares an image signal at said reference position with an image signal at a position located a second integral multiple of said repeat pitch away from said reference position; and

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an inspection region setting portion which sets said reference position as the boundary of said inspection region when a comparison result, obtained from said image comparing portion as a result of incrementally shifting said reference position by said prescribed distance, shows a change greater than a prescribed threshold value.

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15. A pattern comparison inspection apparatus which comprises an imaging portion which captures an image of an inspection target pattern having a repeated pattern region with repeated patterns formed in a repeated fashion at a prescribed repeat pitch, a storing portion which stores said captured image of said inspection target pattern, a pattern comparing portion which compares, on said stored image, image signals taken from positions located a first integral multiple of said repeat pitch away from each other within an inspection region defined inside said repeated pattern region, and a defect detecting portion which detects a defect in said inspection target pattern based on a result of said comparison, said apparatus comprising:

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a reference position selecting portion which selects a reference position which is judged whether it should be contained in said inspection region, by incrementally shifting said reference position by a prescribed distance within said inspection target pattern;

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an image comparing portion which compares an image signal at said reference position with an image signal at a position located a second integral multiple of said repeat pitch away from said reference position; and

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an inspection region setting portion which sets said reference position as the boundary of said inspection region when a comparison result, obtained from said image comparing portion as a result of incrementally shifting said reference position by said prescribed distance, shows a maximum change.

16.   A pattern comparison inspection apparatus as claimed in any one of claims 13 to 15, wherein said image comparing portion compares said image signal at said reference position with an image signal at a position located farther inside said repeated pattern region than said reference position is.

17.   A pattern comparison inspection apparatus as claimed in any one of claims 13 to 15, wherein a position located a prescribed distance inward of the boundary of said repeated pattern region is selected as said reference position, and

said inspection region is set by repeatedly performing said comparison by said image comparing portion while incrementally moving said reference position outwardly toward the boundary of said repeated pattern region.

18.   A pattern comparison inspection apparatus as claimed in any one of claims 13 to 15, further comprising a tentative region setting portion which sets a tentative region a prescribed distance inward of the boundary of said repeated pattern region, and wherein

said image comparing portion compares said image signal at said reference position with an image signal at a position located inside said tentative region.

19.   A pattern comparison inspection apparatus as claimed in claim 18, wherein a position located inside said tentative region is selected as said reference position, and

said inspection region is set by repeatedly performing said comparison by said image

comparing portion while incrementally shifting said
reference position outwardly toward the boundary of said
repeated pattern region.

20. A pattern comparison inspection apparatus as
claimed in any one of claims 13 to 15, wherein a position
located a prescribed distance outward of the boundary of
said repeated pattern region is selected as said
reference position, and

said inspection region is set by
repeatedly performing said comparison by said image
comparing portion while incrementally shifting said
reference position inwardly toward the boundary of said
repeated pattern region.

21. A pattern comparison inspection apparatus which
comprises an imaging portion which captures an image of
an inspection target pattern having a repeated pattern
region with repeated patterns formed in a repeated
fashion at a prescribed repeat pitch, a pattern comparing
portion which compares, on said captured image, image
signals taken from positions located an integral multiple
of said repeat pitch away from each other, and a defect
detecting portion which detects a defect in said
inspection target pattern based on a result of said
comparison, said apparatus comprising:

a defect candidate detecting portion which
compares a predetermined first threshold value with a
difference value taken between pixels separated from each
other by a number of pixels equivalent to said integral
multiple of said repeat pitch in said captured image of
said inspection target pattern, and which detects any
pixel for which said difference value exceeds said first
threshold value as a defect candidate; and

an inspection range determining portion
which selects a reference range of a prescribed size
within said captured image of said inspection target
pattern, and which determines an inspection range by
containing therein said reference range if the number of

defect candidates contained in said reference range is smaller than a predetermined second threshold value, wherein

said defect detecting portion detects a defect in said inspection target pattern within said inspection range.

22. A pattern comparison inspection apparatus as claimed in claim 21, further comprising:

a defect candidate map generating portion which generates a defect candidate map by obtaining said defect candidate from said defect candidate detecting portion for each pixel in said captured image of said inspection target pattern; and

a reference range selecting portion which selects a reference range of a prescribed size within said defect candidate map, wherein

said inspection range determining portion determines said inspection range by containing therein said selected reference range if the number of defect candidates contained in said reference range is smaller than said predetermined second threshold value.

23. A pattern comparison inspection apparatus which comprises an imaging portion which captures an image of an inspection target pattern having a repeated pattern region with repeated patterns formed in a repeated fashion at a prescribed repeat pitch, a pattern comparing portion which compares, on said captured image, image signals taken from positions located an integral multiple of said repeat pitch away from each other, and a defect detecting portion which detects a defect in said inspection target pattern based on a result of said comparison, said apparatus comprising:

a defect candidate detecting portion which compares a predetermined first threshold value with a difference value taken between pixels separated from each other by a number of pixels equivalent to said integral multiple of said repeat pitch in said captured image of

said inspection target pattern, and which detects any pixel for which said difference value exceeds said first threshold value as a defect candidate; and

an inspection range determining portion which selects a reference range of a prescribed size within said captured image of said inspection target pattern by incrementally changing the position of said reference range relative to a prescribed direction, and which determines an inspection range by containing therein said position relative to said prescribed direction if the number of defect candidates contained in said reference range or the proportion of said defect candidates contained in said reference range is smaller than a predetermined second threshold value, wherein

said defect detecting portion detects a defect in said inspection target pattern within said inspection range.

24. A pattern comparison inspection apparatus as claimed in claim 23, further comprising:

a defect candidate map generating portion which generates a defect candidate map by obtaining said defect candidate from said defect candidate detecting portion for each pixel in said captured image of said inspection target pattern; and

a reference range selecting portion which selects a reference range of a prescribed size within said defect candidate map by incrementally changing the position of said reference range relative to a prescribed direction, wherein

said inspection range determining portion determines said inspection range by containing therein said position relative to said prescribed direction if the number of defect candidates contained in said reference range or the proportion of said defect candidates contained in said reference range is smaller than said predetermined second threshold value.